



Postdoctoral Research Fellowship: Applying the Tools of Data Science to Conflict Analysis

July 2022

The Centre on Conflict & Collaboration (CCC) at the Stellenbosch Business School is a hub for research and reflection on conflict and its transformation. An integral part of one of Africa's leading institutions for business as well as development finance research, teaching, and practice, CCC partners with business, government, labour and communities to reduce the costs of conflict and increase opportunities for collaboration. It aims to achieve transformation in the next generation of dispute resolution practitioners and scholars.

The Stellenbosch University School for Data Science and Computational Thinking was launched in July, 2019 with a vision to be a world-class institution in and for Africa. The School is rapidly growing, with diverse set of academics focusing on both the science of data science as well as the application of data science in a diverse set of fields.

The postdoctoral research fellow will work at the heart of the Business & Conflict Research Initiative, an international consortium including Stellenbosch University, the University of Pennsylvania, the University of Copenhagen, and the Peace Research Institute Oslo (PRIO), which also draws on Data Science expertise from the University of Michigan. The initiative advances understanding of the dynamics of the private sector, conflict risk and its mitigation, and peaceful development, with a goal of informing policy, practice and scholarship in these areas.

Development of the Business & Conflict Barometer

The postdoctoral fellow will co-lead efforts to consolidate and advance development of the Business & Conflict Barometer, a tool for organising and analysing data on the private sector and conflict that has been under development since 2019. Elements of the Barometer (at different stages of development) include the following:

- The geospatial and temporal organisation and integration of hundreds of datasets, allowing a wide range of data to be used contemporaneously to gain insight on a particular place, and to learn from comparisons between places;
- Automated analysis of a wide range of textual data sources that identifies the places, actors, themes, and timeframes discussed in documents, allowing the cataloguing and analysis of documents alongside quantitative data;
- The development of measures of whether the conflict temperature (defined as whether narratives of conflict are tending towards escalation or de-escalation) rising or falling over a defined period for a defined location, as well as identification of the actors and issues implicated;
- Development and integration of community-based data systems for data collection and analysis that can be integrated with global systems;
- User interfaces which lower the barriers to use of the Barometer by a wider range of stakeholders.

Scholarly directions

While we expect that the Barometer will prove a useful tool for actors on the ground (e.g., companies, communities, civil society groups, and local governments), as well as for actors responsible for shaping private sector development (e.g., financial intermediaries and insurers, national governments, and international institutions), we also expect the Barometer to facilitate scholarly inquiry into the political economy of business and conflict. It should contribute to fields such as international management, business and human rights, business and peace, conflict studies, peacebuilding, and development finance where large-N statistical and econometric analyses with respect to issues of conflict risk and its mitigation are today difficult to apply. The organising questions of the Business & Conflict Research Initiative with respect to the development of the Barometer are as follows:

1. Better understand the role of the private sector in conflict

Where do we find the private sector in conflict? By coding and analysing textual data, and combining it with other data layers, associations between the private sector and conflict can be explored. For example, it becomes possible to test propositions that certain private sector activities—notably, mining, plantation agriculture, and large-scale infrastructure projects—have a greater association with conflict. Certain issues can also be tested—notably, gender, human rights, cultural heritage, land, water, security, and livelihoods—or certain actors—notably, women-focused businesses, foreign investors, those with international financial institution support, and large companies within a given sector or market—feature more or less prominently in conflict. The data structure enables comparative analyses—e.g., whether conflict sentiment towards business or government is more associated with heightened conflict—and multivariate analyses. It can raise awareness of the need for conflict-sensitive investment, and highlighting where it is not occurring.

2. Continuously improve modelling of risk factors for conflict-prone private sector investment

What makes for risky private sector development in peacebuilding environments? The data structure allows for large-N analyses to test whether conflict sentiment with respect to the investments, issues, and actors discussed in no. 8 above is sensitive, for example, to widely-used measures of rule of law, development outcomes, income levels, public confidence in government, and other measures of institutional robustness. Similarly, sensitivity to pre-existing conflict faultline issues, to weak or conflictual bonds between identity or interest groups, or to other factors identified in the theoretical literature and case studies can be tested. These propositions arise within domains—including private sector development, business environment reform, business and peace, business and human rights, and others—that have so far resisted robust statistical and econometric analyses, producing significant empirical benefit.

3. Improve the evidence base for mediated private sector development

Do collaborative actions or initiatives distinguish less conflict-prone private sector development from that which is more so? Management scholarship posits that conflict risks in the context of a company's operations—even in a conflict-affected area—are largely *not* endogenous, but rather determined by the company's own actions and initiatives. Explanatory variables largely under the control of a private sector may include, for example, the degree to which companies include marginalised groups (including women) in project planning and risk assessment, the degree to which companies relinquish claims to decision-making rights in favour of more consensus-based decision making approaches, the inter-group structure of a firm's stakeholder network; and support for forums intended to improve inter-group relations. Comparative analyses can uncover which company strategies, and which policy initiatives intended to

inform company behaviour, have greatest explanatory power for conflict risk mitigation related to private sector development.

Further information on the Business & Conflict Barometer the research of the Business & Conflict Research Initiative is available to interested candidates from [Professor Brian Ganson](#), Head of the Centre on Conflict & Collaboration at the Stellenbosch Business School.

Expectations for the postdoctoral research fellowship in business and conflict

A post-doctoral fellowship with the Centre on Conflict & Collaboration, jointly funded by the Stellenbosch Business School and the School for Data Sciences and Computational Thinking, has been made available to advance the Conflict Barometer as well as the broader agenda of the Business & Conflict Research Initiative:

- Improve one or more constituent elements of the Business & Conflict Barometer (e.g., natural language processing, geospatial and temporal harmonisation of unlike data sources, local data systems, etc.);
- Integrate the constituent elements of the Business & Conflict Barometer into a more user-friendly and less expert-dependent tool;
- Coach and direct master's level interns (particularly in data sciences) to expand the resource base and reach of the project;
- Deliver academic papers and presentations related either to the tool and its development and/or to research based on analysis growing out of this postdoc fellowship project;
- Apply the tools of data science to team projects, e.g.,
 - Work with big data including the GDELT GKG and the GDELT Events databases
 - Clean and transform the raw GDELT data to extract information about locations, organizations, themes etc. in the news media.
 - Merge other datasets with GDELT data
 - Run BERT models on the GDELT data for sector classification of the news media
 - Create visualizations

In doing so, the post-doctoral fellow will be a critical and valued member of both the Business School and Data School communities, helping to drive inter-disciplinary scholarship.

Requirements

We understand that it is unlikely that a candidate will have significant skills and experience across all relevant dimensions. The following factors will therefore be balanced in any candidate assessment:

- A relevant PhD is required. The candidate must have graduated within the five years prior to beginning the fellowship.

- Applied data science skills and experience are required
 - Excellent knowledge of Python/R or any one data analysis programming language
 - Good knowledge of SQL and experience of running complex queries preferred
 - Prior experience working with large Excel and csv files
 - Good Knowledge of Amazon Web Services and their services—e.g., S3, Athena and Sagemaker—preferred
 - Prior experience building machine Learning models and applying NLP techniques such as BERT on large datasets preferred
 - Knowledge of any one visualization tool such as AWS QuickSight, Tableau or Power BI preferred
 - Experience working with Big Data preferred
- Experience in qualitative research methodology and data analysis, and in particular, demonstrated skill and experience in the analysis of conflict narratives and/or automated textual analysis, will be an advantage.
- A working knowledge of and/or experience with themes such as the political economy of conflict, business and human rights, business and conflict, or peacebuilding will be an advantage.
- Demonstrated ability to learn, adapt, and apply new skills and understanding will be a distinct advantage.
- Team leadership skills will be a distinct advantage.

Please note

Commencement of duties will be as agreed. The term of the Fellowship is one year, renewable for a second year dependent on performance.

Fellowships are awarded tax-free under South African law. Due to this regime, postdoctoral fellows are not appointed as employees of Stellenbosch Business School, and are therefore not eligible for employee benefits. Depending on the interests and qualifications of the Fellow, as well as the needs of the institution, teaching and supervision opportunities within Stellenbosch University of up to 14 hours per week are considered consistent with the Fellowship and may be separately compensated.

The compensation package is designed to provide a basic but reasonable standard of living in South Africa.

To apply

Please send the following to Sunelle Hanekom of the Stellenbosch Business School, at email address shan@sun.ac.za:

- Letter of application.
- Comprehensive curriculum vitae, including list of publications, and the names and contact details of at least two referees.
- A certified copy of your PhD; OR a letter from the registrar at the university where you are registered for your PhD, confirming that you have satisfactorily fulfilled the university's requirements of the doctoral qualification.
- A transcript for your PhD;
- A copy of your ID OR passport photo page.

Applicants should request their referees to forward confidential reports directly to the same address.

You may also contact Ms. Hanekom with any questions.